

FORM PTE-1390 (Modified)  
(REV 10-95)

U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

ATTORNEY'S DOCKET NUMBER

**TRANSMITTAL LETTER TO THE UNITED STATES  
DESIGNATED/ELECTED OFFICE (DO/EO/US)  
CONCERNING A FILING UNDER 35 U.S.C. 371**

1406

U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR

**09/720845**

INTERNATIONAL APPLICATION NO.

**PCT/DE 99/04044**

INTERNATIONAL FILING DATE

**DECEMBER 18, 1999**

PRIORITY DATE CLAIMED

**MAY 25, 1999**

TITLE OF INVENTION

**MOTOR-GEAR UNIT**

APPLICANT(S) FOR DO/EO/US

**Frank MOSKOB**

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☐ This is an express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. ☐ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of the International Application as filed (35 U.S.C. 371 (c) (2))
  - a. ☐ is transmitted herewith (required only if not transmitted by the International Bureau).
  - b. ☒ has been transmitted by the International Bureau.
  - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☒ A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. ☐ A copy of the International Search Report (PCT/ISA/210).
8. ☐ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371 (c)(3))
  - a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
  - b. ☐ have been transmitted by the International Bureau.
  - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
  - d. ☐ have not been made and will not be made.
9. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
10. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371 (c)(4)).
11. ☐ A copy of the International Preliminary Examination Report (PCT/IPEA/409).
12. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371 (c)(5)).

**Items 13 to 18 below concern document(s) or information included:**

13. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
14. ☒ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
15. ☒ A **FIRST** preliminary amendment.  
A **SECOND** or **SUBSEQUENT** preliminary amendment.
16. ☐ A substitute specification.
17. ☐ A change of power of attorney and/or address letter.
18. ☒ Certificate of Mailing by Express Mail
19. ☐ Other items or information:

*EF 215952584 US*


U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR <div style="font-size: 1.5em; font-weight: bold;">09/720845</div>		INTERNATIONAL APPLICATION NO. PCT/DE 99/04044		ATTORNEY'S DOCKET NUMBER 1406	
20. The following fees are submitted: <b>BASIC NATIONAL FEE ( 37 CFR 1.492 (a) (1) - (5) ) :</b> <div style="display: flex; justify-content: space-between;"> <div> <input type="checkbox"/> Search Report has been prepared by the EPO or JPO .....  <input type="checkbox"/> International preliminary examination fee paid to USPTO (37 CFR 1.482) .....  <input type="checkbox"/> No international preliminary examination fee paid to USPTO (37 CFR 1.482) but international search fee paid to USPTO (37 CFR 1.445(a)(2)) .....  <input checked="" type="checkbox"/> Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO .....  <input type="checkbox"/> International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(2)-(4) .....                         </div> <div style="text-align: right;">                         \$930.00                          \$720.00                          \$790.00                          \$1,070.00                          \$98.00                     </div> </div> <div style="text-align: center; margin-top: 10px;"> <b>ENTER APPROPRIATE BASIC FEE AMOUNT =</b> </div>				<b>CALCULATIONS PTO USE ONLY</b>  <div style="border: 1px solid black; height: 100px; width: 100%;"></div>	
Surcharge of <b>\$130.00</b> for furnishing the oath or declaration later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492 (e)).				\$0.00	
CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE		
Total claims	10 - 20 =	0	x \$18.00	\$0.00	
Independent claims	1 - 3 =	0	x \$80.00	\$0.00	
Multiple Dependent Claims (check if applicable). <input type="checkbox"/>				\$0.00	
<b>TOTAL OF ABOVE CALCULATIONS =</b>				<b>\$1,000.00</b>	
Reduction of 1/2 for filing by small entity, if applicable. Verified Small Entity Statement must also be filed (Note 37 CFR 1.9, 1.27, 1.28) (check if applicable). <input type="checkbox"/>				\$0.00	
<b>SUBTOTAL =</b>				<b>\$1,000.00</b>	
Processing fee of <b>\$130.00</b> for furnishing the English translation later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492 (f)).				\$0.00	
<b>TOTAL NATIONAL FEE =</b>				<b>\$1,000.00</b>	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31) (check if applicable). <input checked="" type="checkbox"/>				\$40.00	
<b>TOTAL FEES ENCLOSED =</b>				<b>\$1,040.00</b>	
				Amount to be: refunded	\$
				charged	\$

- ☐ A check in the amount of \_\_\_\_\_ to cover the above fees is enclosed.
- ☒ Please charge my Deposit Account No. **19-4675** in the amount of **\$1,040.00** to cover the above fees.  
 A duplicate copy of this sheet is enclosed.
- ☒ The Commissioner is hereby authorized to charge any fees which may be required, or credit any overpayment to Deposit Account No. **19-4675** A duplicate copy of this sheet is enclosed.

**NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.**

SEND ALL CORRESPONDENCE TO:

**STRIKER, STRIKER & STENBY**  
**103 EAST NECK ROAD**  
**HUNTINGTON, NEW YORK 11743**

  
 SIGNATURE  
**MICHAEL J. STRIKER**  
 NAME  
**27233**  
 REGISTRATION NUMBER  
**DECEMBER 29, 2000**  
 DATE

UNITED STATES PATENT AND TRADEMARK OFFICE

Examiner:                      Group:                      Attorney Docket # 1406

Applicant(s) : MOSKOB, F.

Serial No. :

Filed : Simultaneously

For : MOTOR-GEAR UNIT

**SIMULTANEOUS AMENDMENT**

December 29, 2000

Honorable Commissioner of Patents and Trademarks  
Washington, D.C. 20231

S I R S:

Simultaneously with filing of the above identified application  
please amend the same as follows:

In the Claims:

Claim 3 line 1 delete "one of claims 1 or 2", substitute with "claim 1".

Claim 4 line 1 delete "one of claims 1-3", substitute with "claim 1".

Claim 6 line 1 delete "one of claims 1-5", substitute with "claim 1".

Claim 7 line 1 delete "one of claims 1-6", substitute with "claim 1".

Claim 8 line 1 delete "one of claims 1-7", substitute with "claim 1".

Claim 9 line 1 and 2 delete "one of the foregoing claims", substitute with "claim 1".

Claim 10 line 1 and 2 delete "one of the foregoing claims", substitute with "claim 1".


REMARKS:

This Amendment is submitted simultaneously with filing of the above identified application.

With the present Amendment applicant has amended the claims so as to eliminate their multiple dependency.

Consideration and allowance of the present application is most respectfully requested.

Respectfully submitted,



Michael J. Striker  
Attorney for Applicant(s)  
Reg. No. 27233

3/PATS

## MOTOR-GEAR UNIT

## Prior Art

The invention relates to a motor-gear unit, having an eccentric wheel gear driven by a rotary drive, as generically defined by the preamble to the main claim.

To reduce the rotary speed of control motors with an armature rpm of about 7000 revolutions per minute, worm gears are often used. These worm gears, which are driven by electric motors, are distinguished by having self-inhibition from the power takeoff side. Because of the necessarily high gear ratio required to attain adequate torques, for instance to drive window controls or a sunroof in a motor vehicle, the external dimensions of an adjusting motor, comprising a motor and gears disposed side by side, is considerable.

Other types of gear, used in so-called friction-drum motors, are known, for instance from German Patent Disclosure DE 196 18 248. These friction-drum motors have a tubular motor housing, which surrounds a drum-type armature with an eccentric wheel gear disposed downstream of it. Using eccentric wheel gears is advantageous because while having very compact dimensions they have self-inhibition and a simple design. Compared with the known worm gears, the eccentric wheel gear is comparatively invulnerable to tolerances, since all the rotating parts are supported on one shaft.

The disposition of the eccentric wheel gear, in the friction-drum motor described in DE 196 18 248,

however, is such that in this motor-gear unit as well,  
the external dimensions are comparatively large. It is  
unsuited to applications where there is severely  
restricted installation space, for instance for sunroofs  
or window control systems in motor vehicles.

#### Advantages of the Invention

The motor-gear unit according to the invention  
having the characteristics of the main claim has the  
advantage of extremely great compactness, since the  
eccentric wheel gear is disposed in a free installation  
space of the rotary drive. By integrating the gear with  
the drive, the structural length of the unit is reduced  
considerably and can be selected to be quite small  
compared to its diameter.

A further advantage of the integration of the gear  
according to the invention is that imbalance forces  
occurring during operation at the eccentric wheel can be  
compensated for very simply and precisely by means of  
suitable counterweights on the rotary drive.

By means of the characteristics recited in the  
dependent claims, advantageous refinements of the motor-  
gear unit defined by the main claim are possible.

An especially compact design of the motor-gear  
unit is attained if the eccentric wheel gear is  
surrounded by a rotor of the rotary drive. The inside  
diameter of the rotor is selected to be great enough  
that there is space for the gear inside this diameter.  
The gear can thus be inserted all the way into the  
drive, and an especially advantageous shallow design is

attained.

5 It is also advantageous if the at least one guide  
bolt, which assures the eccentric motion of the  
eccentric wheel and prevents undesired rotation of the  
eccentric wheel, is disposed on a housing part that  
divides the free installation space from the rotary  
drive. Thus the guide bolts that are required to  
operate the eccentric wheel and that advantageously  
guide the eccentric wheel can be integrated with the  
10 motor-gear unit as well.

15 If this at least one guide bolt protrudes into a  
preferably circular recess on the eccentric wheel, then  
the eccentric motion of the eccentric wheel is assured,  
yet at the same time rotation of the eccentric wheel is  
prevented.

20 If the inside width of the recess in the eccentric  
wheel is equivalent to twice the eccentricity of the  
eccentric element, then the at least one guide bolt can  
roll along the wall of the recess, and the desired  
guidance effect is made possible in an optimal way.

25 It is also advantageous if a plurality of guide  
bolts are disposed, symmetrically, about the eccentric  
wheel on the housing part. It has been demonstrated in  
practice that a uniform power takeoff rpm is attained by  
means of at least three bolts offset from one another by  
an angle of  $120^\circ$ . If the number of bolts is increased  
further, then not only is the synchronous operation of  
the motor-gear unit improved, but the forces operative  
in operation and thus the mechanical stresses are also  
30 distributed uniformly to the individual bolts.

The intermittent meshing of the eccentric wheel with the driver is advantageously attained in that the eccentric wheel has an internal toothing and the driver has an external toothing.

5 In an especially advantageous variant, the rotary drive is an electronically commutated motor.

If the eccentric element is formed directly onto the rotor, then the two components can advantageously be made in one piece.

#### 10 Drawing

In the drawing, one exemplary embodiment of a motor- gear unit according to the invention is shown, and this is explained in further detail in the ensuing description.

15 Shown are

Fig. 1, a motor-gear unit in longitudinal section;

Fig. 2, the enlarged region II of Fig. 1; and

Fig. 3, an illustration of various operating states.

#### 20 Description of the Exemplary Embodiment

The exemplary embodiment, shown in Fig. 1, of a motor- gear unit according to the invention shows an electric motor with an eccentric wheel gear, which has a shaft 1 that is secured in a housing bottom 2 in a



manner fixed against relative rotation. A rotary drive with a rotor 3 is rotatably disposed on the shaft 1 and is driven by coils 4 of the electric motor. The coils 4 are disposed on the inside in a cylindrical housing portion 5, and the housing bottom 2 is also secured to the housing portion 5. On the side of the housing portion 5 opposite the housing bottom 2, a housing part 6 in the form of a cap with a central opening 7 is mounted in fixed fashion. The end of the shaft 1 remote from the housing bottom 2 protrudes through this central opening 7.

The housing portion 5, housing bottom 2, and cap 6 form a motor housing, in whose interior the rotor 3 is disposed, which is rotatable on the shaft 1 and is provided with an eccentric element 8 that extends axially along the center axis 9 and that is provided with an eccentric axis 8a. An eccentric wheel 10 is rotatably supported on the eccentric element 8 and is provided with an internal toothing 11.

The internal toothing 11 of the eccentric wheel 10 meshes intermittently with an external toothing 14 of a driver 15 that is supported rotatably on the shaft 1 and is axially secured with fastening means 16. The driver 15 protrudes through the housing part 6 out of the motor housing, and in this region, for the gear output, it is provided with a further external toothing 17.

The version of the rotary drive 3 shown in Fig. 1 has the effect that within the rotary drive 3, a free installation space is created, into which the eccentric wheel gear is integrated. The drive and the gear are supported on the same shaft 1.

For spatial separation of the free installation space from the motor region, a gear housing part 20 is provided, on which the guide bolts 22 for the eccentric wheel 10 are disposed in fixed fashion. The guide bolts 22 protrude into recesses 24, which are embodied in circular form and machined into the eccentric wheel 10.

The characteristics pertaining to the guide bolts 22 are shown once again in an enlarged view in Fig. 2 for the sake of greater clarity. In this Fig. 2, as in all the other drawings, the same characteristics are provided with the same reference numerals.

In Figs. 3a-3c, three different operating positions of the eccentric gear wheel are shown. For comprehension of these drawings, the basic mode of operation of an eccentric wheel gear will now be explained again briefly.

By means of the magnetic field induced in the coils 4 of Fig. 1, the rotor 3 rotates about the shaft 1, which is connected to the housing bottom 2 in a manner fixed against relative rotation. As a result of the rotation of the rotor 3, the eccentric element 8 also rotates about the shaft 1.

The eccentric wheel 10 rotatably supported on the eccentric element 8 would roll with its internal toothing 11 along the external toothing of the driver 15, but on its own - because of the guidance by the guide bolts 22 - it cannot execute any rotation about itself. Thus the driver 15, also rotatably connected to the shaft 1, rolls with its toothing 14 along the internal toothing 11. As a result of this rolling of

the driver 15 in the eccentric wheel 10, a step down in the rotary motion of the driver 15 is attained, which is carried onward via the external toothing 17 of the driver 15.

5           The eccentric wheel 10 consequently executes a circular motion, which is permitted by the guide bolts 22, since the guide bolts 22 are guided in the circular recesses 24 of the eccentric wheel 10.

10           If the diameter of the circular recesses 24 in the eccentric wheel 10 is equivalent to twice the eccentricity of the eccentric element 8, then the guide bolts 22 can roll in an ideal way along the inside surface of the circular recesses 24. This enables the driver 15 to roll in the eccentric wheel 10, which is shown in Figs. 3a-3c at 0°, 120° and 240° for the three different positions.

15           The motor-gear unit according to the invention is naturally not limited to the exemplary embodiment described; what is decisive is that the eccentric wheel gear is integrated into the free installation space of the drive, thus achieving an especially shallow and compact design.

20

## Claims

1. A motor-gear unit, having an eccentric wheel gear, driven by a rotary drive (3), which eccentric wheel gear has an eccentric element (8), an eccentric wheel (10) rotatably supported on the eccentric element, and a driver (15), and the driver (15) cooperates with the eccentric wheel (10) by intermittent meshing, further having at least one guide bolt (22), which cooperates with the eccentric wheel (10) and both assures the eccentric motion of the eccentric wheel (10) and prevents an undesired rotation of the eccentric wheel 10,

characterized in that

the eccentric wheel gear is disposed in a free installation space of the rotary drive (3).

2. The motor-gear unit of claim 1, characterized in that the eccentric wheel gear is surrounded by a rotor (3) of the rotary drive.

3. The motor-gear unit of one of claims 1 or 2, characterized in that the at least one guide bolt (22) is disposed on a housing part (20) that divides the free installation space from the rotary drive.

4. The motor-gear unit of one of claims 1-3, characterized in that the at least one guide bolt (22) protrudes into a preferably circular recess (24) on the eccentric wheel (10).

5. The motor-gear unit of claim 4, characterized in that the inside width of the recess (24) in the eccentric wheel (10) is equivalent to twice the eccentricity of the eccentric element (8).

6. The motor-gear unit of one of claims 1-5, characterized in that a plurality of guide bolts (22) are disposed, preferably symmetrically, about the eccentric wheel (10) on the housing part (20).

7. The motor-gear unit of one of claims 1-6, characterized in that the eccentric wheel (10) has an internal toothing (11).

8. The motor-gear unit of one of claims 1-7, characterized in that the driver (15) has an external toothing (14).

9. The motor-gear unit of one of foregoing claims, characterized in that the rotary drive is an electronically commutated motor.

10. The motor-gear unit of one of foregoing claims, characterized in that the eccentric element (8) is formed directly onto the rotor (3).

## Abstract

A motor-gear unit, having an eccentric wheel gear, driven by a rotary drive (3), which eccentric wheel gear has an eccentric element (8), an eccentric wheel (10) rotatably supported on the eccentric element, and a driver (15), and the driver (15) cooperates with the eccentric wheel (10) by intermittent meshing, further having at least one guide bolt (22), which cooperates with the eccentric wheel (10) and both assures the eccentric motion of the eccentric wheel (10) and prevents an undesired rotation of the eccentric wheel 10. It is proposed that the eccentric wheel gear is disposed in a free installation space of the rotary drive (3).

(Fig. 1)

Fig.1

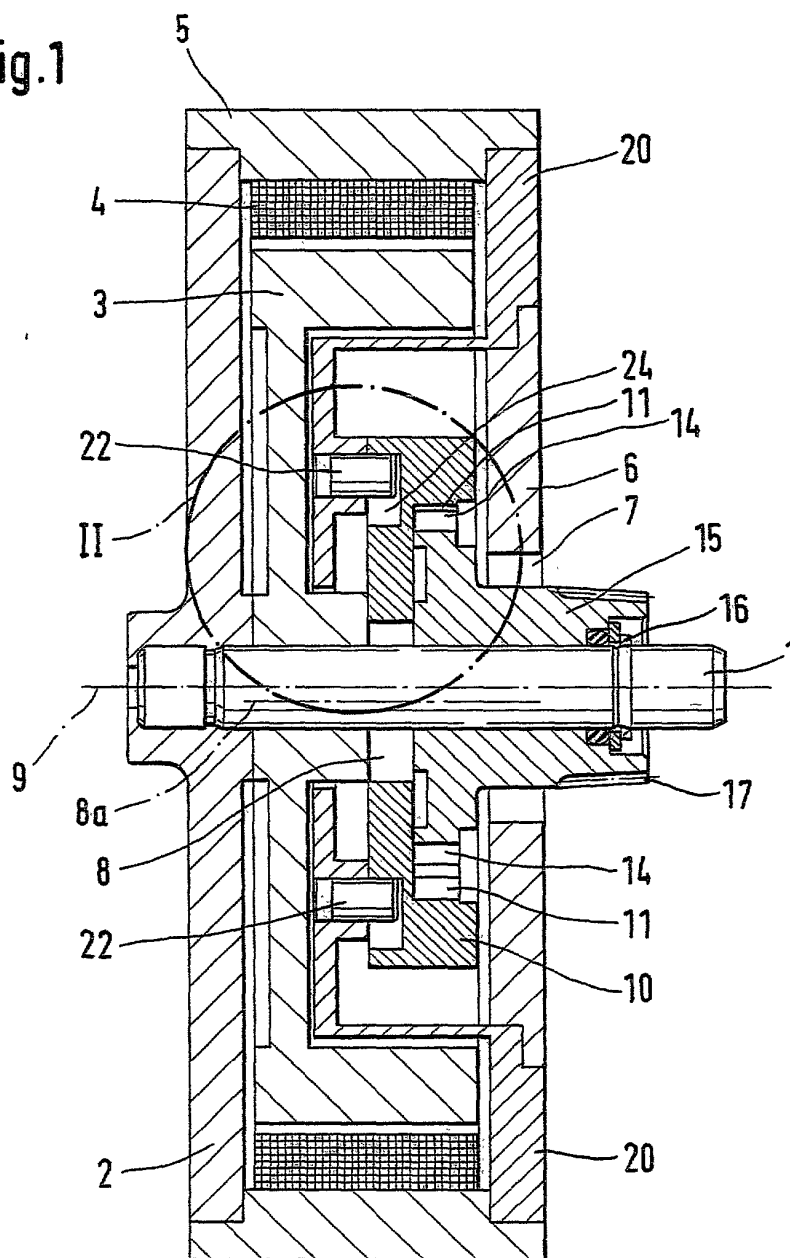


Fig. 2

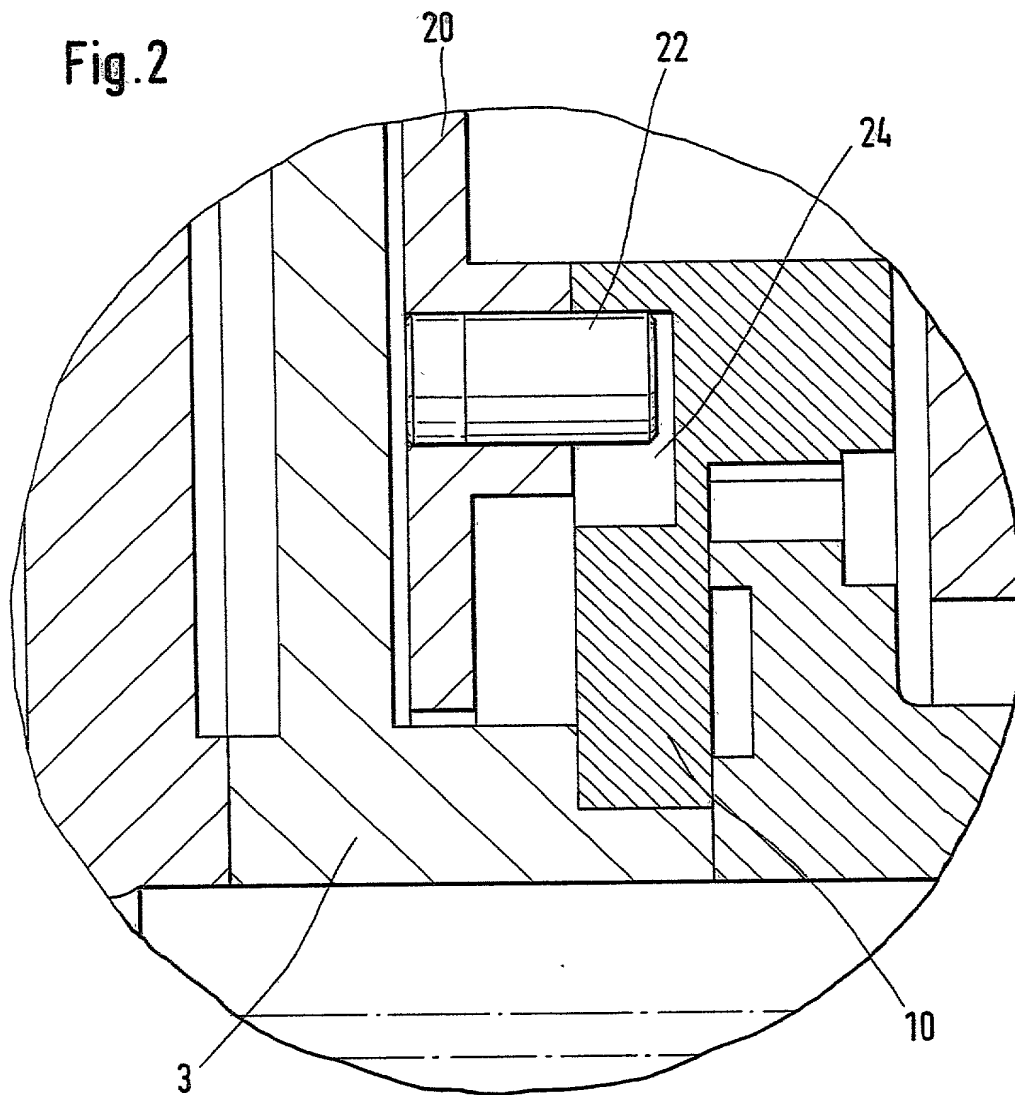




Fig.3a

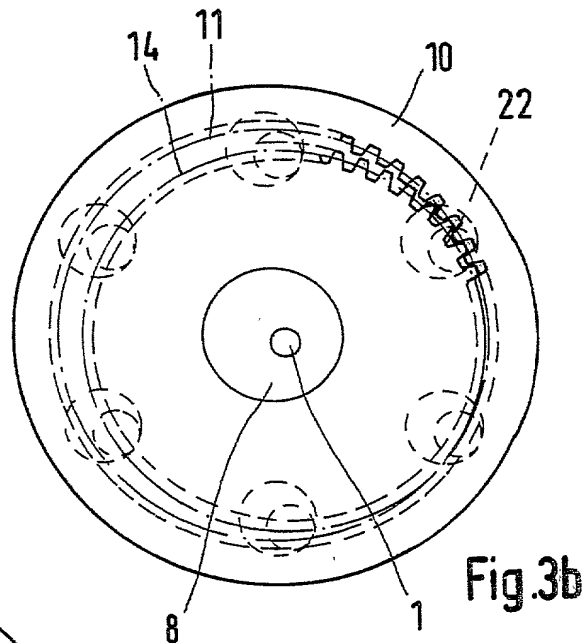
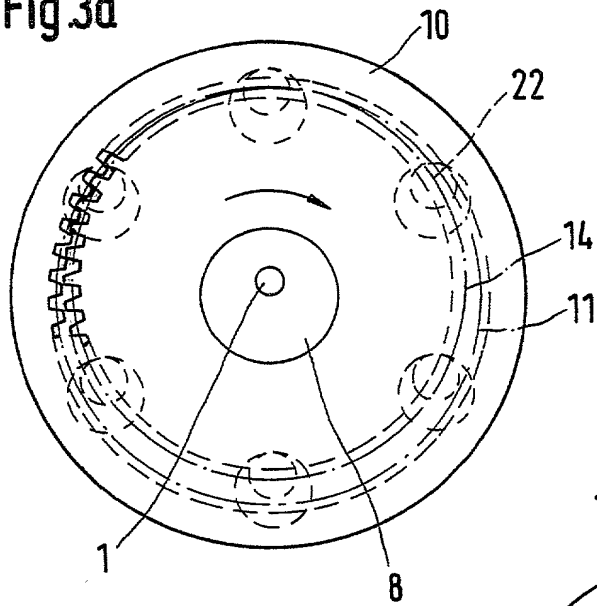


Fig.3b

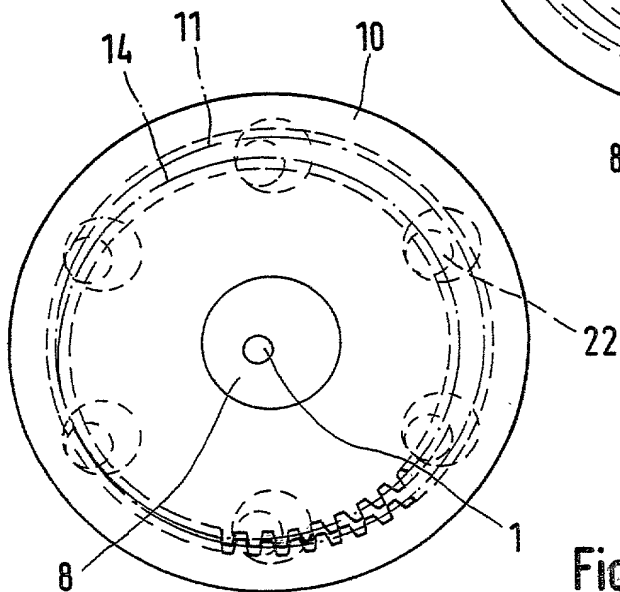


Fig.3c

R.35694

**DECLARATION AND POWER OF ATTORNEY FOR NATIONAL STAGE OF PCT PATENT APPLICATION**

As a below-named inventor, I hereby declare that:

Frank MOSKOB

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled **MOTOR-GEAR UNIT** the specification of which was filed as PCT International Application number PCT/DE 99/04044 on December 18, 1999.

I hereby state that I believe the named inventor or inventors in this Declaration to be the original and first inventor or inventors of the subject matter which is claimed and for which a patent is sought.

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose all information which is material to the patentability of this application in accordance with Title 37, Code of Federal Regulations, Section 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, Section 119(a)-(d) or Section 365 (b) of any foreign application(s) for patent or inventor's certificate, or Section 365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate or PCT International application having a filing date before that of the application on which priority is claimed.

Prior foreign application(s):

Priority claimed:

<u>199 23 877.4</u>	<u>GERMANY</u>	<u>MAY 25, 1999</u>	<u>X</u>	
(Number)	(Country)	(Date filed)	Yes	No
<u>                    </u>	<u>                    </u>	<u>                    </u>	<u>Yes</u>	<u>No</u>
(Number)	(Country)	(Date filed)	Yes	No

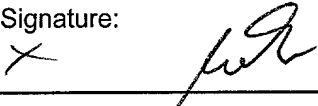
As a named inventor, I hereby appoint the following attorney to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith:

Michael J. Striker, Reg. No. 27233

Direct all telephone calls to Striker, Striker & Stenby at telephone no.: (631) 549 4700 and address and all correspondence to:

STRIKER, STRIKER & STENBY  
103 East Neck Road  
Huntington, New York 11743  
U.S.A.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that wilful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such wilful false statement may jeopardize the validity of the application or any patent issued thereon.

Signature: 	Date: <i>12.12.00</i>	Residence and Full Postal Address: Friedrich-Ebert-Strasse 11 77815 Buehl Germany <i>DEX</i>
Full Name of First or Sole Inventor: <u>Frank MOSKOB</u>	Citizenship: GERMAN	
Signature:	Date:	Residence and Full Postal Address:
Full Name of Second Inventor:	Citizenship:	
Signature:	Date:	Residence and Full Postal Address:
Full Name of Third Inventor:	Citizenship:	
Signature:	Date:	Residence and Full Postal Address:
Full Name of Fourth Inventor:	Citizenship:	
Signature:	Date:	Residence and Full Postal Address:
Full Name of Fifth Inventor:	Citizenship:	
Signature:	Date:	Residence and Full Postal Address:
Full Name of Sixth Inventor:	Citizenship:	
Signature:	Date:	Residence and Full Postal Address:
Full Name of Seventh Inventor:	Citizenship:	
Signature:	Date:	Residence and Full Postal Address:
Full Name of Eighth Inventor:	Citizenship:	
Signature:	Date:	Residence and Full Postal Address:
Full Name of Ninth Inventor:	Citizenship:	

December 27, 2000

DECLARATION

The undersigned, Jan McLin Clayberg, having an office at 5316 Little Falls Road, Arlington, VA 22207-1522, hereby states that she is well acquainted with both the English and German languages and that the attached is a true translation to the best of her knowledge and ability of International Patent Application PCT/DE 99/04044 of MOSKOB, F., entitled "MOTOR-GEAR UNIT".

The undersigned further declares that the above statement is true; and further, that this statement was made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or document or any patent resulting therefrom.

  
Jan McLin Clayberg